

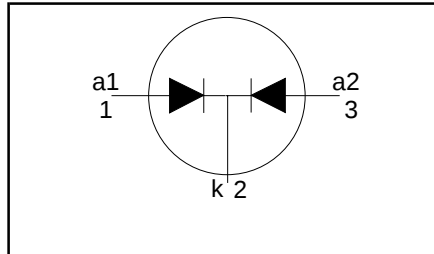
Rectifier diodes ultrafast, rugged

BYQ30E, BYQ30EB, BYQ30ED series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$$V_R = 150 \text{ V} / 200 \text{ V}$$

$$V_F \leq 0.95 \text{ V}$$

$$I_{O(AV)} = 16 \text{ A}$$

$$I_{RRM} = 0.2 \text{ A}$$

$$t_{rr} \leq 25 \text{ ns}$$

GENERAL DESCRIPTION

Dual, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ30E series is supplied in the SOT78 conventional leaded package.

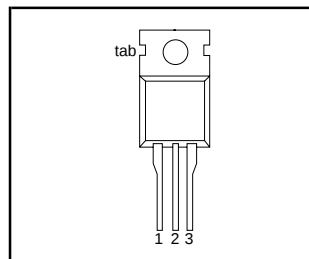
The BYQ30EB series is supplied in the SOT404 surface mounting package.

The BYQ30ED series is supplied in the SOT428 surface mounting package.

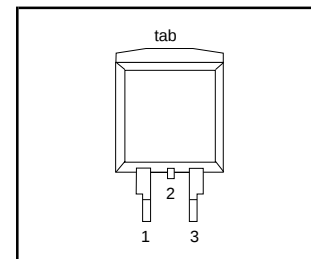
PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode ¹
3	anode 2
tab	cathode

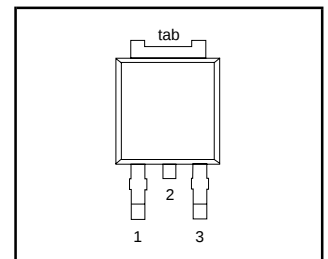
SOT78 (TO220AB)



SOT404



SOT428



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
V_{RRM}	Peak repetitive reverse voltage	BYQ30E/ BYQ30EB/ BYQ30ED	-	-150 150	-200 200	V
V_{RWM}	Working peak reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave; $\delta = 0.5$; $T_{mb} \leq 104^\circ\text{C}$	-	16		A
I_{FRM}	Repetitive peak forward current per diode	square wave; $\delta = 0.5$; $T_{mb} \leq 104^\circ\text{C}$	-	16		A
I_{FSM}	Non-repetitive peak forward current per diode	$t = 10 \text{ ms}$	-	80		A
		$t = 8.3 \text{ ms}$	-	88		A
I_{RRM}	Peak repetitive reverse surge current per diode	sinusoidal; with reapplied $V_{RRM(max)}$ $t_p = 2 \mu\text{s}$; $\delta = 0.001$	-	0.2		A
I_{RSM}	Peak non-repetitive reverse surge current per diode	$t_p = 100 \mu\text{s}$	-	0.2		A
T_j	Operating junction temperature		-	150		$^\circ\text{C}$
T_{stg}	Storage temperature		- 40	150		$^\circ\text{C}$

1. It is not possible to make connection to pin 2 of the SOT428 or SOT404 packages.

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ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; $C = 250 \text{ pF}$; $R = 1.5 \text{ k}\Omega$	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th \text{ j-mb}}$	Thermal resistance junction to mounting base	per diode	-	-	3	K/W
$R_{th \text{ j-a}}$	Thermal resistance junction to ambient	both diodes	-	-	2.5	K/W
		SOT78 package, in free air	-	60	-	K/W
		SOT404 and SOT428 packages, pcb mounted, minimum footprint, FR4 board	-	50	-	K/W

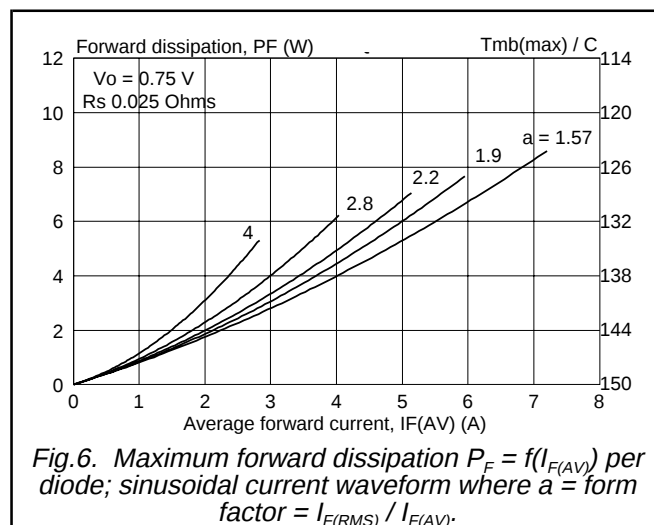
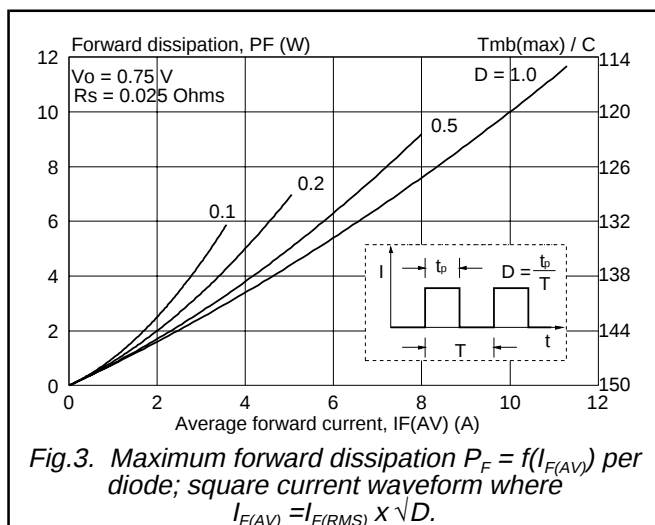
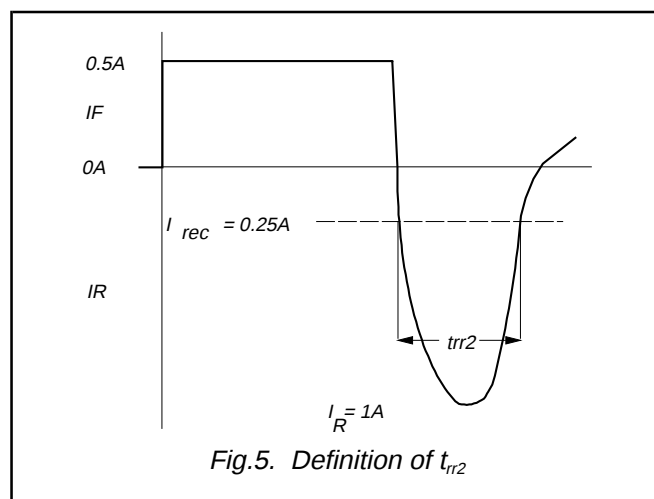
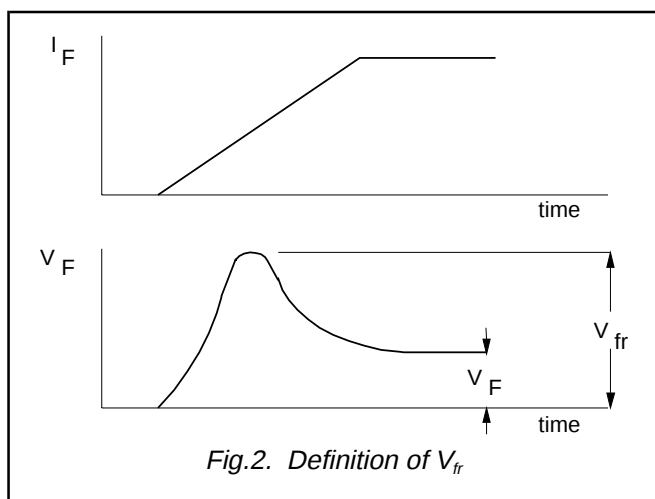
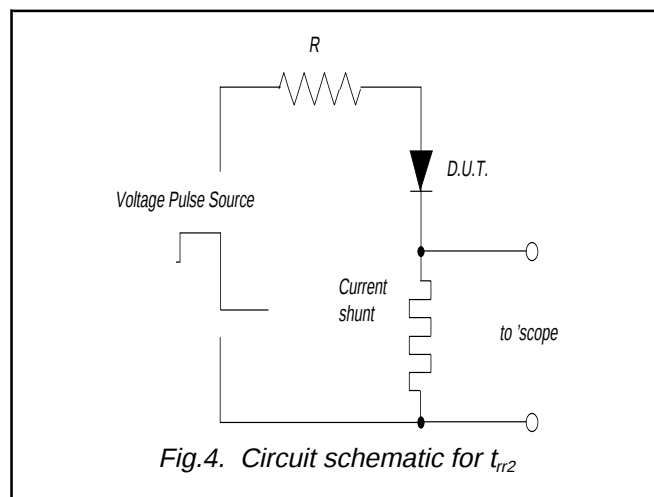
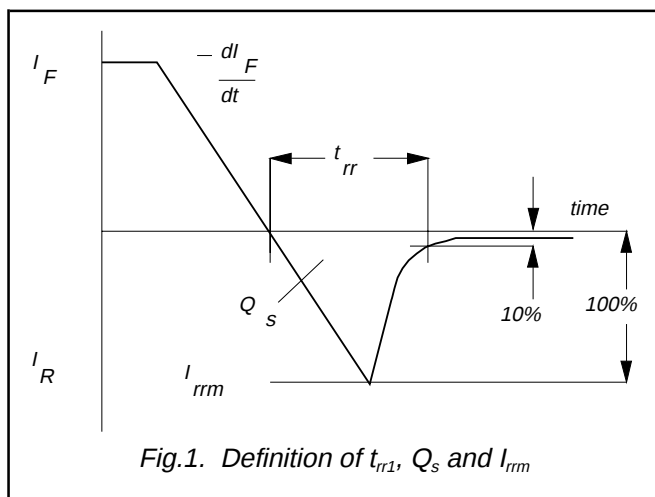
ELECTRICAL CHARACTERISTICS

All characteristics are per diode at $T_j = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	$I_F = 8 \text{ A}$; $T_j = 150^\circ\text{C}$	-	0.84	0.95	V
		$I_F = 16 \text{ A}$; $T_j = 150^\circ\text{C}$	-	1	1.15	V
I_R	Reverse current	$I_F = 16 \text{ A}$	-	1.12	1.25	V
		$V_R = V_{RWM}$	-	4	30	μA
Q_{rr}	Reverse recovered charge	$V_R = V_{RWM}$; $T_j = 100^\circ\text{C}$	-	0.3	0.6	mA
t_{rr1}	Reverse recovery time	$I_F = 2 \text{ A}$; $V_R \geq 30 \text{ V}$; $-di_F/dt = 20 \text{ A}/\mu\text{s}$	-	4	11	nC
t_{rr2}	Reverse recovery time	$I_F = 1 \text{ A}$; $V_R \geq 30 \text{ V}$; $-di_F/dt = 100 \text{ A}/\mu\text{s}$	-	20	25	ns
V_{fr}	Forward recovery voltage	$I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$; $I_{rec} = 0.25 \text{ A}$	-	12	22	ns
		$I_F = 1 \text{ A}$; $di_F/dt = 10 \text{ A}/\mu\text{s}$	-	1	-	V

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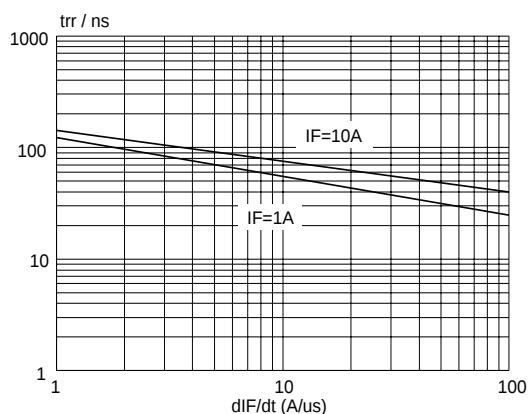


Fig.7. Maximum t_{rr} at $T_j = 25\text{ }^{\circ}\text{C}$; per diode

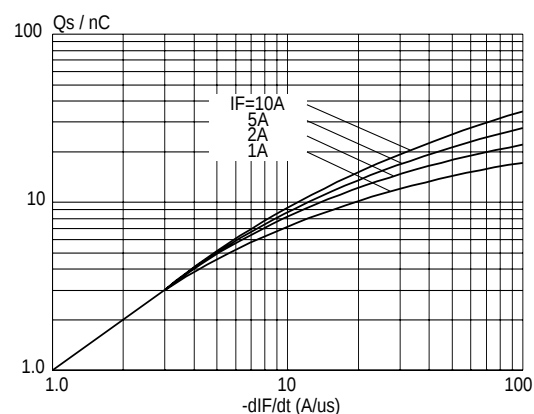


Fig.10. Maximum Q_s at $T_j = 25\text{ }^{\circ}\text{C}$; per diode

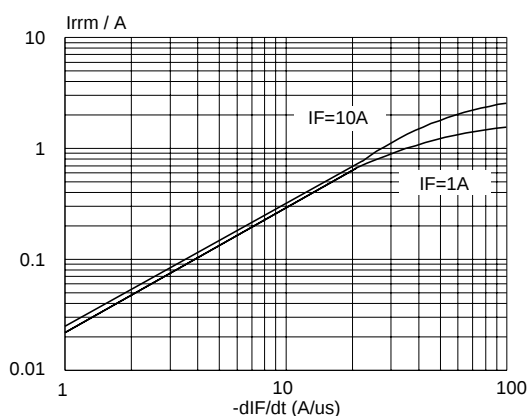


Fig.8. Maximum I_{rrm} at $T_j = 25\text{ }^{\circ}\text{C}$; per diode

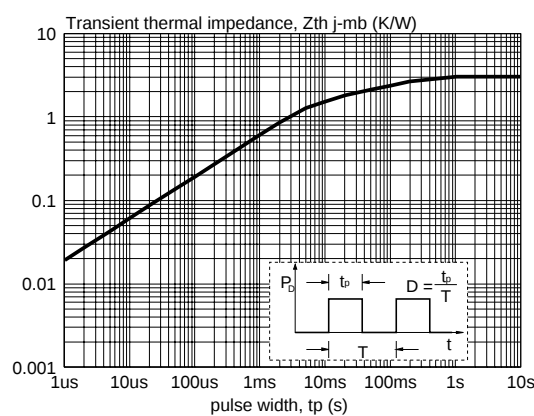


Fig.11. Transient thermal impedance; per diode;
 $Z_{th\ j-mb} = f(t_p)$.

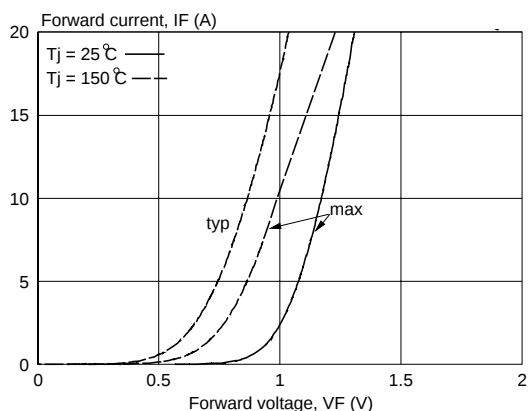


Fig.9. Typical and maximum forward characteristic
 $I_F = f(V_F)$; parameter T_j

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MECHANICAL DATA

Dimensions in mm

Net Mass: 2 g

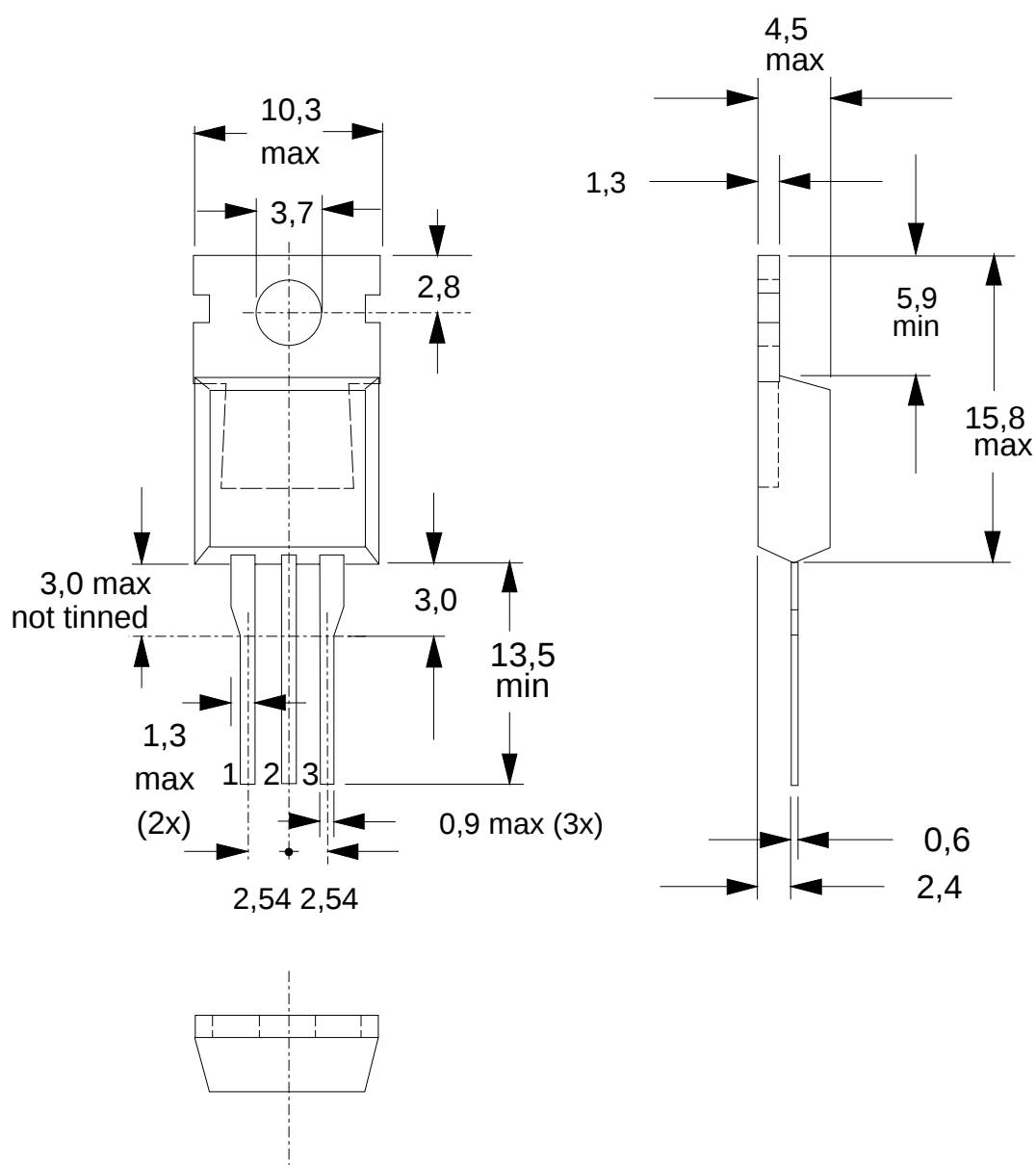


Fig.12. SOT78 (TO220AB); pin 2 connected to mounting base.

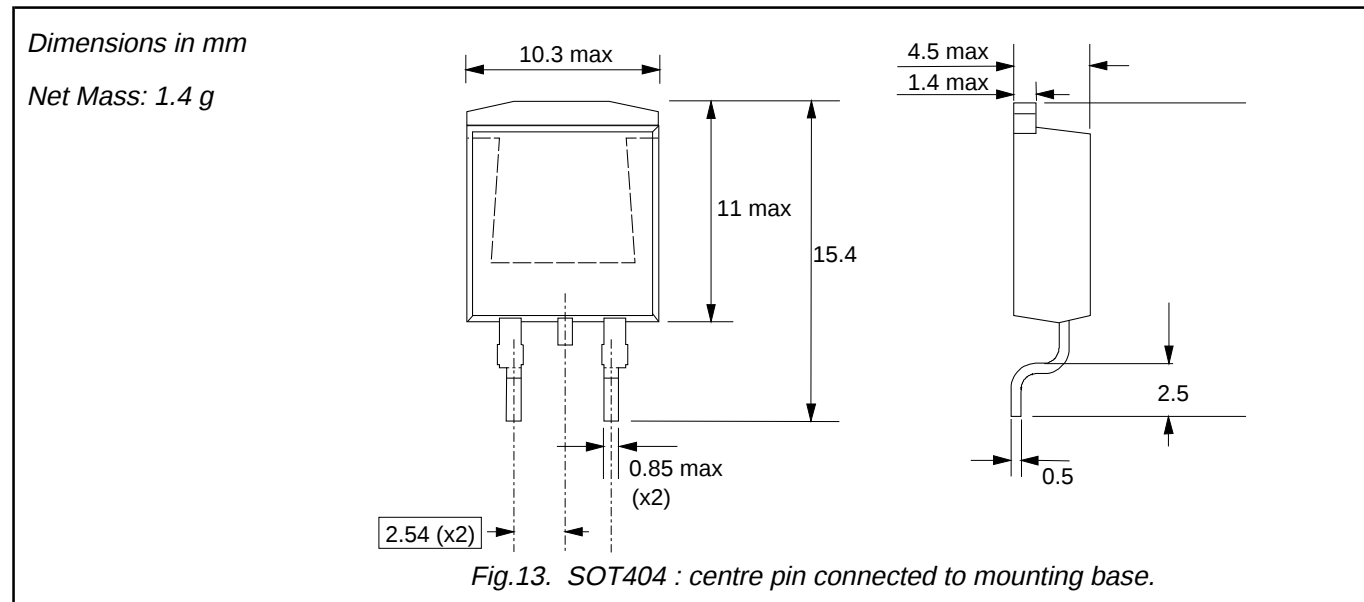
Notes

1. Refer to mounting instructions for SOT78 (TO220) envelopes.
2. Epoxy meets UL94 V0 at 1/8".

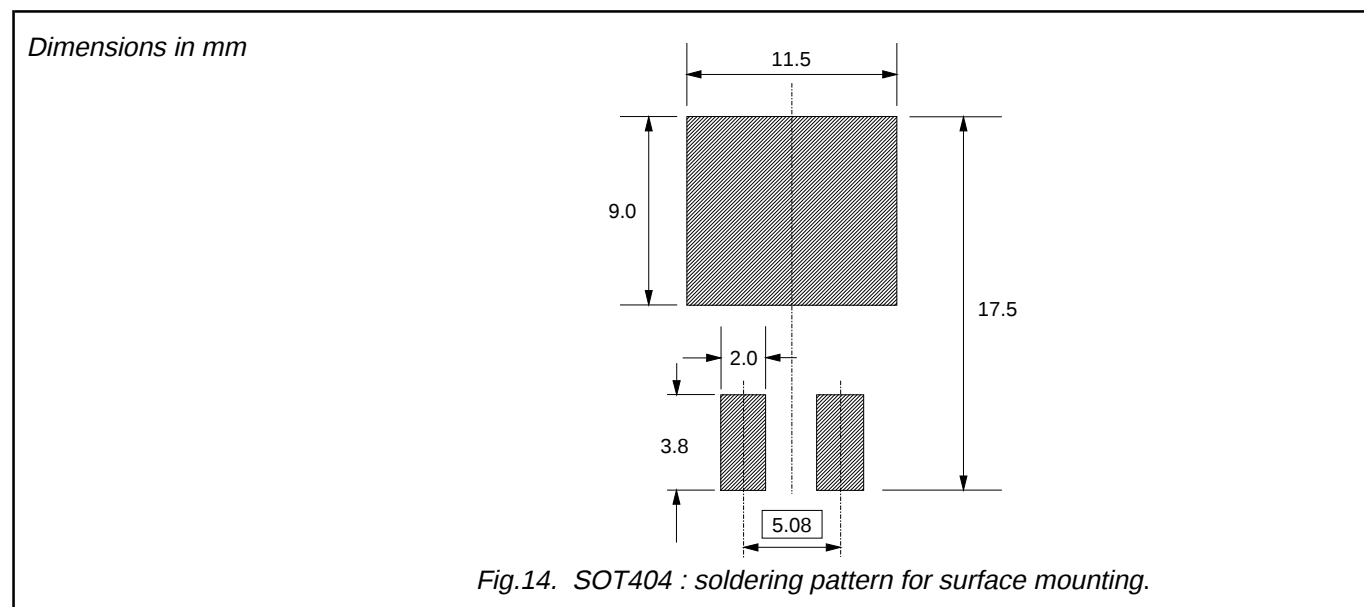
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MECHANICAL DATA



MOUNTING INSTRUCTIONS



Notes

1. Epoxy meets UL94 V0 at 1/8".

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MECHANICAL DATA

Dimensions in mm

Net Mass: 1.1 g

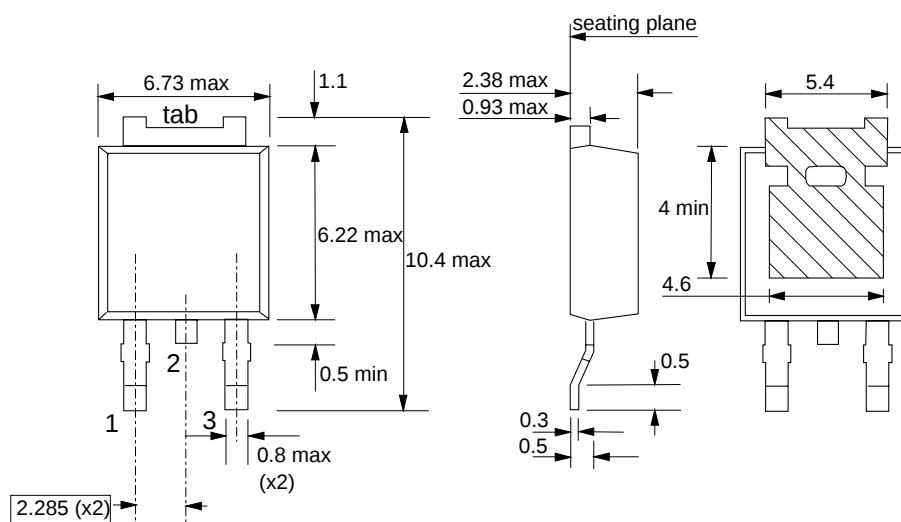


Fig.15. SOT428 : centre pin connected to tab.

MOUNTING INSTRUCTIONS

Dimensions in mm

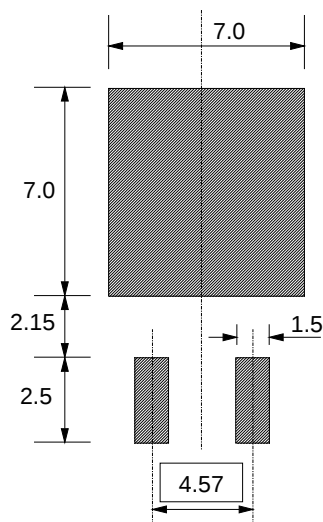


Fig.16. SOT428 : minimum pad sizes for surface mounting.

Notes

1. Plastic meets UL94 V0 at 1/8".

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DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	
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